

## SPINAL EXPANSION APPARATUS

1    BACKGROUND OF THE INVENTION

2    1. Field of the Invention

3                 The present invention relates to an expansion apparatus, and more  
4                 particularly to a spinal expansion apparatus which is able to securely and easily  
5                 sandwiched between two adjacent spinal disks to rectify the deformed spine.

6    2. Description of Related Art

7                 With reference to Figs. 7 and 8, a conventional spinal expansion device  
8                 is composed of a primary sleeve (50) with an inner threading (51) and a  
9                 secondary sleeve (60) with an outer threading (61) corresponding to the inner  
10          threading (51) of the primary sleeve (50).

11                When the conventional spinal expansion device is in application, a tool  
12          (70) is inserted into the secondary sleeve (60) to rotate the secondary sleeve (60)  
13          inside the primary sleeve (50). Due to the mutual mating between the inner  
14          threading (51) and the outer threading (61), the secondary sleeve (60) is  
15          advancing in the primary sleeve (50). Further, because the secondary sleeve (60)  
16          has a conical cross section, the advancement of the secondary sleeve (60) in the  
17          primary sleeve (50) forces the primary sleeve (50) to expand in size. Thus, after  
18          the primary sleeve (50) is expanded, the original deformed two adjacent spinal  
19          disks are able to be forced to move further apart from each other such that the  
20          distance between the two adjacent spinal disks is maintained normal.

21                However, when the secondary sleeve (60) is advancing in the primary  
22          sleeve (50), the expansion of the primary sleeve (50) due to the conical cross

1 section of the secondary sleeve (60) is not evenly distributed. That is, the  
2 distance between two adjacent spines is not evenly expanded, which may cause a  
3 serious consequence.

4 To overcome the shortcomings, the present invention tends to provide an  
5 improved spinal expansion apparatus to mitigate the aforementioned problems.

6 **SUMMARY OF THE INVENTION**

7 The primary objective of the present invention is to provide an improved  
8 spinal expansion apparatus having two rows of supports oppositely and movably  
9 received in the body. When the two rows of supports are forced to extend out of  
10 the body, each row of the supports engage with a spine to evenly separate two  
11 adjacent spines.

12 Other objects, advantages and novel features of the invention will  
13 become more apparent from the following detailed description when taken in  
14 conjunction with the accompanying drawings.

15 **BRIEF DESCRIPTION OF THE DRAWINGS**

16 Fig. 1 is a perspective view of the spinal expansion apparatus of the  
17 present invention;

18 Fig. 2 is a schematic cross sectional view showing the internal structure  
19 of the body of the spinal expansion apparatus of the present invention;

20 Fig. 3 is a schematic view showing that when the support is not in use;

21 Fig. 4 is a schematic view showing that the support is retracted in the  
22 passage in the body when the support is in engagement with a spine;

23 Fig. 5 is a schematic view before the spinal expansion apparatus is

1      inserted into two adjacent spines;

2            Fig. 6 is a schematic view showing the status after the spinal expansion  
3      apparatus is inserted into two adjacent spines and the supports are activated;

4            Fig. 7 is an exploded perspective view of a conventional spinal  
5      expansion device; and

6            Fig. 8 is a schematic view showing the application of the conventional  
7      spinal expansion device in Fig. 7.

8      **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

9            With reference to Fig. 1, the spinal expansion apparatus in accordance  
10     with the present invention includes a body (1) and a tool (2).

11            With reference to Fig. 2 and still taking Fig. 1 for reference, the body (1)  
12     has passages (11) oppositely defined in the body (1), a bolt (12) movably  
13     received in a channel (13) in the body (1) to orthogonally communicate with the  
14     passages (11) and supports (14) each movably received in a corresponding one  
15     of the passages (11). The bolt (12) has an outer threading (121) formed on an  
16     outer periphery of the bolt (12) and V-shaped grooves (122) defined in the outer  
17     periphery of the bolt (12) to correspond to the supports (14).

18            With reference to Figs. 3 and 4, it is noted that a shoulder (111) is formed  
19     in each of the passages (11) and each support (14) has a flange (141) formed on  
20     an outer periphery of the support (14) to correspond to the shoulder (111) so that  
21     the support (14) is maintained in the corresponding passage (11) of the body (1).  
22     Furthermore, each of the supports (14) has a top conical head (142) and a bottom  
23     conical head (143) oppositely formed relative to the top conical head (142). The

1 bottom conical head (143) is engaged with a bottom face defining the V-shaped  
2 groove (122) and the top conical head (142) is facing outside the passage (11).  
3 From the depiction in Figs. 3 and 4, it is noted that while the support (14) is not in  
4 use, the support (14) is supported by the interaction between the flange (141) and  
5 the shoulder (111) and the top conical head (142) extends out of the passage (11).  
6 Meanwhile, the bottom conical head (143) is not in engagement with the bottom  
7 face defining the V-shaped groove (122).

8 However, when the top conical head (142) is engaged with a surface, e.g.  
9 the surface of a spine, the support (14) is forced into the passage (11) and the  
10 bottom conical head (142) is engaged with the bottom face defining the V-  
11 shaped groove (122).

12 Still further, with reference to Fig. 1 again, the body (1) has a hole (15), a  
13 driving hole (16) and a threaded hole (17) all defined in a side face of the body  
14 (1). The tool (2) includes a stabilizing bar (21), a driving bar (22) and a securing  
15 bar (23) with a threaded head (231) formed on the front portion of the securing  
16 bar (23). A connection plate (24) is provided to securely engage with a distal end  
17 of the stabilizing bar (21). Both the driving bar (22) and the securing bar (23)  
18 rotatably extend through the connection plate (24) and the driving bar (22) has a  
19 handle (221) fixedly provided on a distal end of the driving bar (22). That is, the  
20 first distal end of the stabilizing bar (21) is securely and fixedly connected to the  
21 connection plate (24), the first distal end of the driving bar (22) is securely  
22 connected to the handle (221) and the first distal end of the securing bar (23)  
23 extends through the connection plate (24).

1           The stabilizing bar (21) has a sharp second distal end corresponding to  
2       the hole (15). The driving bar (22) has a second distal end so configured to mate  
3       with the driving hole (16) and threaded head (231) of the securing bar (23)  
4       corresponds to the threaded hole (17).

5           With reference to Figs. 5 and 6, when the apparatus of the present  
6       invention is in application, the operator first inserts the body (1) into two  
7       adjacent spines (shown in dashed lines). Then, the operator extends the  
8       stabilizing bar (21) into the hole (15) to stabilize the tool (2) relative to the body  
9       (1). The driving bar (22) is then extended into the driving hole (16) and the  
10      securing bar (23) is screwed into the threaded hole (17) to secure the connection  
11      between the tool (2) and the body (1).

12          Thereafter, the operator rotates the handle (221) to further extend the  
13      bolt (12) in the channel (13). When the bolt (12) is advancing in the channel (13),  
14      side faces of the V-shaped grooves (122) abut the bottom conical heads (143) of  
15      the supports (14) and eventually force the supports (14) to extend from the  
16      passages (11). Because the bolt (12) is cylindrical, the advancement of the  
17      supports (14) out of the passages (11) is simultaneous and thus the travelling  
18      distance of each of the supports (14) is the same as the others. Therefore, the  
19      distance between two adjacent spines is evenly expanded.

20          It is to be understood, however, that even though numerous  
21      characteristics and advantages of the present invention have been set forth in the  
22      foregoing description, together with details of the structure and function of the  
23      invention, the disclosure is illustrative only, and changes may be made in detail,

- 1 especially in matters of shape, size, and arrangement of parts within the
- 2 principles of the invention to the full extent indicated by the broad general
- 3 meaning of the terms in which the appended claims are expressed.